

# Negative Attention Bias is Associated with Negative Affect and Rumination: An Internet-Based Study

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## Summary

### Background

- Poor cognitive control over negative stimuli is thought to contribute to perseverative thinking, a major factor in depression and anxiety.
- To investigate the association between negative attention bias, one form of cognitive control, perseverative thinking, and negative affect symptoms, we conducted an online study in which one sample was recruited from online forums (e.g., Reddit) and one from Amazon's Mechanical Turk.

### Results

- In both groups, symptoms of depression and anxiety were weakly associated with attention bias (i.e., trial level bias score metrics).
- In the Reddit sample, bias was inversely associated with attention bias. For instance, participants who had a 100 ms decrease in variability had a significantly increased risk of having high rates of perseverative thinking.
- Variability was not associated with perseverative thinking in the Mechanical Turk sample, which was larger and had much better task accuracy than the Reddit sample.

### Implications

- Negative attention bias may be a weaker predictor of negative affect and perseverative thinking than previously thought.
- Decreased variability may indicate increased perseverative thinking.
- Recruiting online samples from Amazon Mechanical Turk, rather than other online forums, may result in more accurate responses.

	Reddit	Mechanical Turk
Included in analyses, <i>N</i>	229	837
Removed due to low accuracy, <i>n</i> (%)	390 (63%)	170 (16.8%)
Age, <i>M</i> ( <i>SD</i> )	26.6 (6.3)	31.7 (7.0)
Women, <i>n</i> (%)	92 (40.2%)	474 (56.6%)
White, <i>n</i> (%)	176 (76.9%)	585 (69.9%)
MASQ Total, <i>M</i> ( <i>SD</i> )	79.7 (21.1)	70.0 (20.4)
MASQ GD, <i>M</i> ( <i>SD</i> )	24.1 (12.1)	22.1 (9.6)
MASQ AD, <i>M</i> ( <i>SD</i> )	37.3 (8.3)	30.4 (9.2)
MASQ AA, <i>M</i> ( <i>SD</i> )	18.3 (7.9)	17.5 (7.4)
PTQ, <i>M</i> ( <i>SD</i> )	15.6 (12.7)	15.3 (9.3)

**Table 1.** A comparison of the Reddit and Mechanical Turk samples. MASQ: Mood and Anxiety Symptom Questionnaire, GD: General Distress, AD: Anhedonic Depression, AA: Anxious Arousal; PTQ: Perseverative Thinking Questionnaire.

## Methods

### Participants

Participants were adults between the ages of 18 and 55. The Reddit sample included 229 participants recruited from online forums, such as Reddit and Craigslist. The Mechanical Turk sample included 837 participants recruited from Amazon Mechanical Turk. Participants completed the following:

- Demographics and self-reported measures of mood, anxiety, and perseverative thinking.
- A dot-probe task designed to measure negative attention bias (Figure 1).

### Data Analysis

In the Reddit sample, 63% of participants were dropped, and in the Mechanical Turk sample, 17% of participants were dropped, due to low accuracy and invalid responses.

Traditional and trial-level bias scores were computed according to Zvielli et al. (2014). Trials were weighted by comparing each trial to the distance-weighted mean of all trials of the opposite type (negative or neutral).

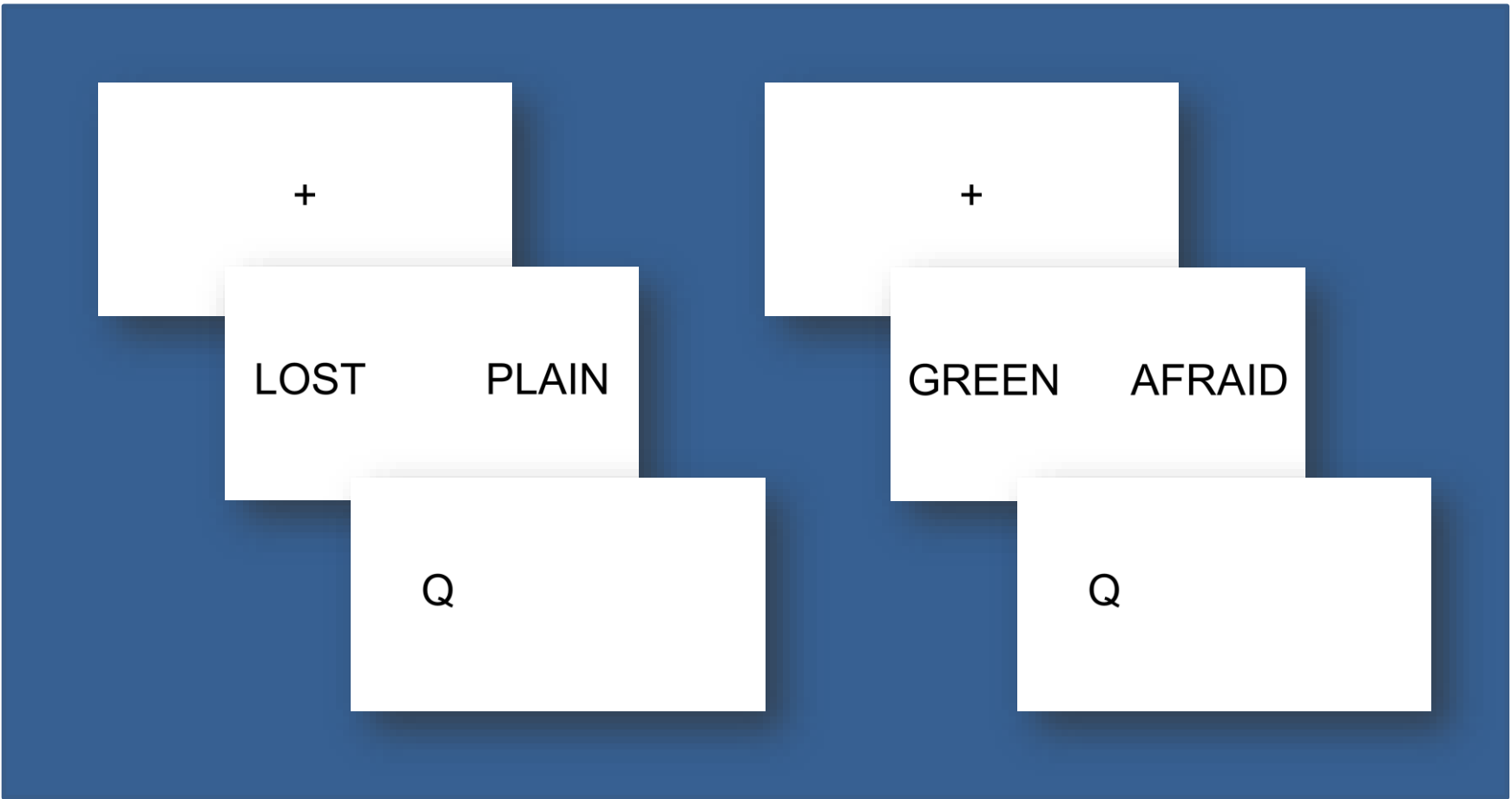
		Bias Towards	Bias Away	Variability
Reddit	MASQ Total	-.07	-.15	-.10
	PTQ	-.30	-.39	-.36
Mechanical Turk	MASQ Total	.01	.01	-.00
	PTQ	.00	-.01	-.01

**Table 2.** Correlations between measures of negative attention bias and symptoms of mood and perseverative thinking. MASQ: Mood and Anxiety Symptom Questionnaire; PTQ: Perseverative Thinking Questionnaire.

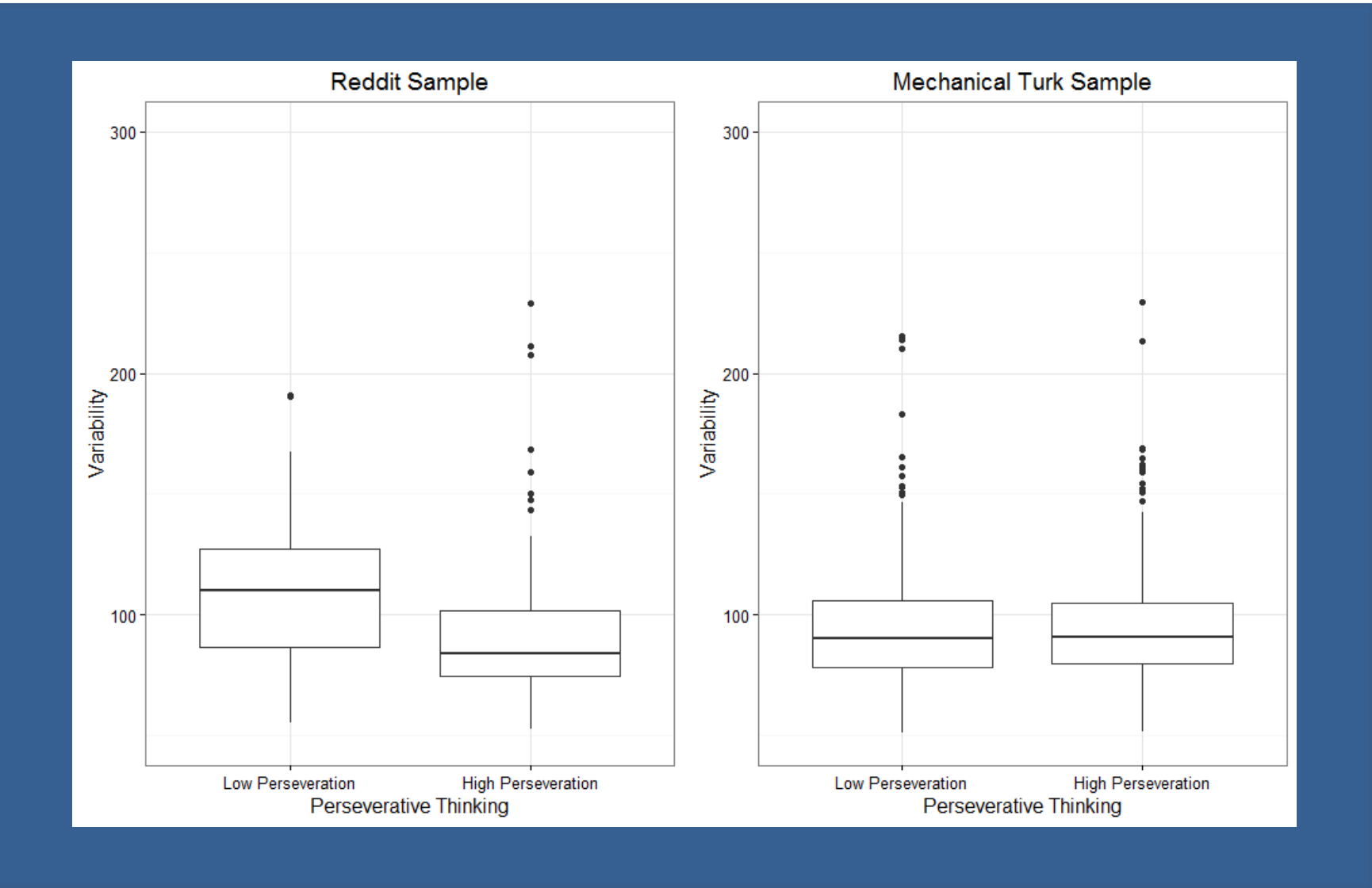
## Results

In both samples, variability in attention bias over time was strongly correlated with both bias towards negative stimuli and bias away from negative stimuli (*r* ranges from .87 to .89). Thus, we focus on variability in our findings.

In the Reddit sample, attention bias was inversely associated with perseverative thinking. For instance, participants who had a 100 ms decrease in variability were at higher risk of also having high rates of perseverative thinking (*OR* = 8.81, 95% CI [3.39, 25.04], *p* < .001). However, variability was not associated with rates of perseverative thinking in the Mechanical Turk sample, (*OR* = 1.01, 95% CI [0.58, 1.74], *p* = .97; Figure 2). Variability was not correlated with symptoms of negative affect in either sample (Table 2).



**Figure 1.** A congruent trial (left) and an incongruent trial (right) of the dot-probe task. After a fixation cross, one negative and one neutral word are presented, followed by a letter cue. Participants respond to the cue by identifying the letter. Attention bias is measured by difference in reaction time to negative and neutral words. Words were taken from the ANEW database (Bradley & Lang, 1999) and matched for arousal and length.



**Figure 2.** In the Reddit sample, participants who had a 100 ms decrease in variability in attention bias had 8.8 times the risk of also having high rates of perseverative thinking. In the Mechanical Turk sample, variability was not associated with perseverative thinking.

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